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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/847,091	05/01/2001	Eric Arthur Swanson	SYCS-042 (P96)	5732
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LAHIVE & COCKFIELD, LLP. 28 STATE STREET BOSTON, MA 02109			KIM, DAVID S	
			ART UNIT	PAPER NUMBER
			2633	6

DATE MAILED: 07/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/847,091

Applicant(s)

SWANSON, ERIC ARTHUR

Examiner

David S. Kim

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 15-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 15-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. Applicant's response filed on 09 April 2004 (Paper No. 5) included an argument rebuffing the objection to the drawings (Paper No. 4, mailed on 15 January 2004). This argument has been considered and is persuasive. Accordingly, the objection is withdrawn.

Claim Rejections - 35 USC § 112

2. Applicant's amendment filed on 09 April 2004 (Paper No. 5) addressed a rejection of claims 17-23 under 35 U.S.C. 112, second paragraph. This amendment has been considered and adequately defines the claimed subject matter contained therein. Accordingly, the rejection is withdrawn.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. **Claims 1, 3-10, 12-13, 15-22, and 24-28** are rejected under 35 U.S.C. 102(a) as being anticipated by the admitted prior art.

Regarding claim 1, the admitted prior art discloses:

An optical sub-assembly for processing an optical signal, the sub-assembly comprising:

a working path of the optical network (path for working channels through amplifiers 58 and 60 in Fig. 1C, p. 3, l. 29-30);

a first sub-band (the actual physical group of channels, or sub-band, that passes through the working path; note that the scope of "sub-band" is not limited to a "sub-

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band,” like a continuous range of wavelengths or frequencies, as may be intended by Applicant) of the optical signal carried only by the working path;

a protect path (path for protect channels through amplifiers 58 and 60 in Fig. 1C, p. 3, l. 29-30) of the optical network;

a second sub-band (the actual physical group of channels, or sub-band, that passes through the protect path; note that the scope of “sub-band” is not limited to a “sub-band,” like a continuous range of wavelengths or frequencies, as may be intended by Applicant) of the optical signal carried only by the protect path;

a first module disposed along the working path for affecting the working path (any module along the working path in Fig. 1C, i.e. amplifier 58); and

a second module disposed along the protect path for affecting the protect path (any other module, besides the first module, along protect path in Fig. 1C, i.e. amplifier 60).

Note that this rejection relies on an interpretation of “sub-band” that may be broader than Applicant intends. As a way to obviate this rejection, Examiner suggests adjustment to the language of independent claim 1 by adding further distinguishing limitations of Applicant’s “sub-band” so that other interpretations of “sub-band” do not apply.

Regarding claims 3-10, the admitted prior art discloses:

The sub-assembly of claim 1, wherein the first and second modules are comprised of:

(claim 3) optical amplifiers (amplifiers 58 and 60).

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(claim 4) band pass filters (switches 54 and 68 that demultiplex input signals depending on the wavelength of the signals, passing one band to one output and passing another band to another output, p. 2, line 30 – p. 3, line 4).

(claim 5) channel add devices (add/drop node 66 plus further instances of add/drop nodes, not shown in Fig. 1C, in expanded versions of the apparatus).

(claim 6) channel drop devices (add/drop node 66 plus further instances of add/drop nodes, not shown in Fig. 1C, in expanded versions of the apparatus).

(claim 7) demultiplexers (switches 54 and 68 that demultiplex input signals depending on the wavelength of the signals, p. 2, line 30 – p. 3, line 4).

(claim 8) multiplexers (switches 62 and 76 that multiplex input signals together, p. 2, line 32 – p. 3, line 5).

(claim 9) interleavers (switches 54 and 68 that demultiplex input signals depending on the wavelength of the signals, directing one band of signals to one output and then alternately directing, or interleaving, another band of signals to another output, p. 2, line 30 – p. 3, line 4).

(claim 10) attenuators (any of the above devices have some measure of finite insertion loss, attenuating input signals).

Regarding claim 12, the admitted prior art discloses:

A method of processing an optical signal in an optical network, comprising the steps of:

separating (L/C splitter, p. 7, l. 27-29) the optical signal into a first sub-band (C-band) supporting a working path (C-band working path, p. 7, l. 28-29) and a second sub-band (L-band) supporting a protect path (L-band protect path, p. 7, l. 31-32);

routing the first sub-band through a first module (module that is band-dependent for C-band, p. 7, l. 25-27) to form the working path and routing the second

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sub-band through a second module (module that is band-dependent for L-band, p. 7, l. 25-27) of the same type as the first module to form the protect path; and

recombining the first and second sub-bands (switches 62 and 76 that multiplex input signals together, p. 2, line 32 – p. 3, line 5).

Note that the scope of independent claim 12 differs from the scope of independent claim 1. In particular, claim 1 has the distinguishing limitations of:

- a first sub-band of the optical signal carried *only* by the working path; and
- a second sub-band of the optical signal carried *only* by the protect path.

The admitted prior art includes the features of:

- a first sub-band supporting a working path *and a protect path*; and
- a second sub-band supporting a protect path *and a working path*.

The present scope of claim 12 is broad enough to read on these features. Thus, this rejection does not rely on the interpretation of “sub-band” applied to reject claim 1.

Nonetheless, even if the scope of claim 12 were narrowed to at least the scope of claim 1, claim 12 would still be rejected under the interpretation of “sub-band” applied to reject claim 1. As a way to obviate this rejection, Examiner suggests adjustment to the language of independent claim 12:

- by adding further distinguishing limitations to narrow the scope of claim 12 to at the least the scope of claim 1 and
- by adding further distinguishing limitations of Applicant’s “sub-band” so that other interpretations of “sub-band” do not apply.

Regarding claim 13, the admitted prior art discloses:

The method of claim 12, wherein the separating step comprises the step of routing the optical signal through an L/C splitter (L/C splitter, p. 7, l. 27-29).

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Regarding claims 15-22, claims 15, 16, 17, 18, 19, 20, 21, and 22 are method claims that correspond to apparatus claims 3, 4, 5, 6, 7, 8, 9, and 10, respectively. Therefore, the recited means in apparatus claims 3-10 read on the corresponding steps in method claims 15-22.

Regarding claim 24, the admitted prior art discloses:

An optical amplifier node for amplifying an optical signal, the amplifier node comprising:

a first amplifier (amplifiers 58) for amplifying only signals from a first sub-band (the actual physical group of channels, or sub-band, that passes through the path for working channels through amplifiers 58 and 60 in Fig. 1C, p. 3, l. 29-30; note that the scope of "sub-band" is not limited to a "sub-band," like a continuous range of wavelengths or frequencies, as may be intended by Applicant) of the optical signal, wherein the signals are carried only by a working path (path for working channels through amplifiers 58 and 60 in Fig. 1C, p. 3, l. 29-30); and

a second amplifier for amplifying only signals from a second sub-band (the actual physical group of channels, or sub-band, that passes through the path for protect channels through amplifiers 58 and 60 in Fig. 1C, p. 3, l. 29-30; note that the scope of "sub-band" is not limited to a "sub-band," like a continuous range of wavelengths or frequencies, as may be intended by Applicant) of the optical signal, wherein the signals are carried only by a protect path (path for protect channels through amplifiers 58 and 60 in Fig. 1C, p. 3, l. 29-30).

Similar to the treatment of claim 1, note that this rejection relies on an interpretation of "sub-band" that may be broader than Applicant intends. As a way to obviate this rejection, Examiner suggests adjustment to the language of independent

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claim 24 by adding further distinguishing limitations of Applicant's "sub-band" so that other interpretations of "sub-band" do not apply.

Regarding claim 25, the admitted prior art discloses:

The optical amplifier node of claim 24, further comprising a sub-band splitter (L/C splitter, p. 7, l. 27-29) for splitting the optical signal into at least two sub-bands.

Note that this rejection relies on the interpretation that the "at least two sub-bands" are claimed in a way that does not necessarily correlate them to the "first sub-band" and the "second sub-band" of parent claim 24. Rather, the term "sub-band," as presently claimed, is broad enough to apply in multiple ways. In parent claim 24, "sub-band" is interpreted to mean the actual physical group of channels, or sub-band, that passes through the path for working channels or the path for protect channels through amplifiers 58 and 60. In child claim 25, "sub-band" is interpreted to mean the C-band or L-band of optical transmission wavelength/frequencies.

Regarding claim 26, the admitted prior art discloses:

The optical amplifier node of claim 25, wherein the sub-band splitter is an L/C splitter (L/C splitter, p. 7, l. 27-29).

Regarding claim 27, the admitted prior art discloses:

The optical amplifier node of claim 24, further comprising a sub-band combiner for combining at least two sub-bands into the optical signal (switches 62 and 76 that multiplex input signals together, p. 2, line 32 – p. 3, line 5).

Regarding claim 28, the admitted prior art discloses:

The optical amplifier node of claim 27, wherein the sub-band combiner is an L/C combiner (switches 62 and 76 that multiplex input signals together, p. 2, line 32 – p. 3, line 5, combining L-band signals and C-band signals)

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Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Admitted prior art alone:

6. **Claims 11 and 23** are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art.

Regarding claim 11, the admitted prior art does not expressly disclose:

The sub-assembly of claim 1, wherein the first and second modules are comprised of:

dispersion compensation modules.

However, these modules are extremely well known and common in the art.

Dispersion is an effect that has been studied for decades in the field of optical communications. Generally, dispersion limits the transmission distance of optical signals. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to incorporate dispersion compensation modules in the apparatus of the admitted prior art. One of ordinary skill in the art would have been motivated to do this to compensate for the effect of dispersion, reducing the limiting effect of dispersion, thus lengthening the transmission limits of the optical signals of the admitted prior art.

Regarding claim 23, claim 23 is a method claim that corresponds to apparatus claim 11. Therefore, the recited means in apparatus claim 11 read on the corresponding steps in method claim 23.

Admitted prior art in view of Ramaswami et al.:

7. **Claims 1-13 and 15-28** are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Ramaswami et al. (*Optical Networks: A Practical Perspective*).

Regarding claim 1, consider Fig. 1C of the admitted prior art. Note that the drawing shows unidirectional links connecting each node to another node by using single line arrows. However, also note that Fig. 1B and p. 2, l. 6-7 disclose more than one path represented by each single line arrow, a working path and a protect path. In view of this plurality of paths represented by each single line arrow in Fig. 1B, one of ordinary skill in the art can reasonably conclude a similar plurality of paths represented by each single line arrow in Fig. 1C, a working path and a protect path.

Next, note that the specification discusses span protection (p. 2, l. 29) and a shadow span that diversely protects each span between nodes (p. 3, l. 19-20). However, the details of this span protection and shadow span are not expressly disclosed. Nonetheless, in view of the plurality of paths represented by each single line arrow in Fig. 1C, a working path and a protect path, one of ordinary skill in the art can reasonably expect a span protection scheme and shadow span that incorporate a working path and a protect path.

Such protection schemes and shadow spans are well known and common throughout the art. Ramaswami et al. teaches three such schemes and spans (p. 430-432, Figure 10.2). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to implement one of these schemes and spans as the protection scheme and span of the apparatus of the admitted prior art, for example, 1:1 protection. One of ordinary skill in the art would have been motivated to do this since

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they are all conventional protection schemes and spans that are suitable to the apparatus of the admitted prior art to provide resilience against failures (Ramaswami et al., p. 430, 1st full paragraph). For motivation to implement, for example, 1:1 protection, there are advantages of capacity for extra lower-priority traffic and of sharing a single protect path among many working paths (Ramaswami et al., p. 432, 2nd full paragraph).

In short, this combination of the admitted prior art and Ramaswami et al. simply provides 1:1 (or 1:N) protection as the span protection scheme and shadow span of the admitted prior art.

In view of this combination, claim 1 reads on one case of operation:

the failure of the working span between switch 54 and amplifier 60 in Fig. 1C.

An optical sub-assembly for processing an optical signal, the sub-assembly comprising:

a working path of the optical network (working span in Figure 10.2 of Ramaswami et al., located on span between switch 54 and amplifier 58 in Fig. 1C of the admitted prior art);

a first sub-band (C-band or L-band, p. 7, l. 28-29) of the optical signal carried only by the working path (no signal on protection span in Figure 10.2 of Ramaswami et al., located on span between switch 54 and amplifier 58 in Fig. 1C of the admitted prior art);

a protect path (protection span in Figure 10.2 of Ramaswami et al., located on span between switch 54 and amplifier 60 in Fig. 1C of the admitted prior art) of the optical network;

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a second sub-band (L-band or C-band, p. 7, l. 28-29) of the optical signal carried only by the protect path (no signal on working span in Figure 10.2 of Ramaswami et al., located on span between switch 54 and amplifier 60 in Fig. 1C of the admitted prior art);

a first module disposed along the working path for affecting the working path (amplifier 58 in Fig. 1C); and

a second module disposed along the protect path for affecting the protect path (amplifier 60 in Fig. 1C).

Note that this rejection relies on an observation that independent claim 1 is broad enough to read on an obvious case of operation of the admitted prior art in view of Ramaswami et al. Additionally, note that Examiner's application of "sub-band" in this rejection may match Applicant's intentions. As a way to obviate this rejection, Examiner suggests adjustment to the language of the independent claims by adding further distinguishing limitations of Applicant's apparatus so that this obvious case, and other obvious cases, of operation of the admitted prior art in view of Ramaswami et al. do not apply.

Regarding claim 2, the admitted prior art in view of Ramaswami et al. discloses:

The sub-assembly of claim 1, wherein the first sub-band is one of a C-band and an L-band (C-band or L-band, p. 7, l. 28-29), and the second sub-band is the other of a C-band and an L-band (L-band or C-band, p. 7, l. 28-29).

Regarding claims 3-13 and 15-28, the treatment of independent claim 1 is similarly applied here to the other independent claims 12 and 24. The treatment of dependent claims 3-11, 13-23, and 25-28 under the admitted prior alone is similarly

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applied here to dependent claims 3-11, 13-23, and 25-28 under the admitted prior art in view of Ramaswami et al.

Response to Arguments

8. Applicant's arguments, see Paper No. 5, filed on 09 April 2004, with respect to the rejection(s) of the previous version of the claim(s) have been fully considered and are persuasive. Therefore, the rejections have been withdrawn. However, upon further consideration, new ground(s) of rejection are made in view of the admitted prior art alone and also in view of the admitted prior art in view of Ramaswami et al.

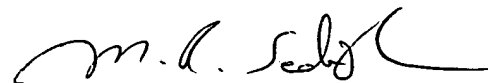
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Kim whose telephone number is 703-305-6457. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 703-305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DSK


M.R. SEDIGHIAN
Primary Examiner
Art Unit: 2633